WINZLER & KELLY
CONSULTING ENGINEERS

Ref: 90-1297-01049

June 1, 2005

Mr. Robert Stone
Humboldt County Department of Health and Human Services
Division of Environmental Health
100 H Street, Suite 100
Eureka, CA 95501

Re: Quarterly Groundwater Monitoring Data for March 2005 and Project Summary, Former Dutra Trucking Facility, 5005 Boyd Road, Arcata, California. LOP # 12264

Dear Mr. Stone:

On behalf of Mr. Frank Dutra, Winzler & Kelly Consulting Engineers (Winzler & Kelly) is submitting this quarterly groundwater monitoring report for March 2005 for the above-referenced site. Included with this report are a Site Conceptual Model and our request for commentary or concurrence on recommendations to define steps leading to regulatory site closure.

The purpose of this report is to document the results and conclusions drawn from the quarterly groundwater monitoring program at the above-referenced site. All figures and tables referred to herein are included in Appendix A and Appendix B, respectively. Laboratory analytical reports for the current sampling event are contained in Appendix C, Standard Operating Procedures (SOPs) are contained in Appendix D, and field notes are contained in Appendix E. A 1994 report containing data on sensitive receptors is included in Appendix F.

FIRST QUARTER 2005 GROUNDWATER MONITORING REPORT

The timing of the March 4, 2005 sampling event was chosen to follow a period of unusually heavy rainfall to maximize the possibility that groundwater would be found in the site's monitoring wells. Even with the heavy rainfall, only three of the five wells produced groundwater.

On March 4, 2005, a Winzler & Kelly technician obtained water levels from monitoring wells MW-2, MW-3, and MW-5 (monitoring wells MW-1, MW-4 were dry). Monitoring wells, MW-2 and MW-3, contained adequate water for purging prior to sampling, and though MW-5 was sampled; purging was not performed due to poor expected recharge. Monitoring wells MW-2 and MW-3 were sampled according to Winzler & Kelly SOPs for *Monitoring Well Purging and Sampling Activities* (Appendix D). Maps illustrating the site vicinity, monitoring well locations, and previous groundwater gradient information are shown on Figures 1, and 2, respectively (Appendix A).

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Hydrographic Data

Depth to water measurements were collected after removing all well caps and allowing the wells to stabilize for at least 15 minutes under ambient barometric pressure. Cumulative water level measurements are presented in Table 1 (Appendix B). Groundwater gradient magnitude and directions data are presented in Table 2 (Appendix B). Hydrographic parameters were calculated using well casing elevations and depth to water data performed in accordance with Winzler & Kelly SOPs (Appendix D).

On March 3, 2004, Ontiveros & Associates surveyed well locations and casing top elevations to facilitate calculation of groundwater gradient and allow electronic data submittal. Top of casing elevations were surveyed to the nearest 0.01 foot above mean sea level (msl) relative to the NAD88 datum, as required for submittal of survey data to the State Water Resources Control Board Geotracker System (Geotracker). Well locations were surveyed relative to the State Plane Coordinate System and in degrees latitude/ longitude to seven decimal places. Cumulative hydrographic data are discussed in the narrative below, as well as presented on Tables 1 and 2, (Appendix B).

The March 2005 groundwater gradient between the three site monitoring wells containing water was calculated as a three-point problem. The March 2005 groundwater gradient was calculated to be 20.6 feet per 100 feet and flowing in a westerly direction at approximately 278 degrees Azimuth (see Figure 2, Appendix A).

The March 2005 groundwater gradient direction is consistent with site topography and the location of the Mad River relative to the site. However, the calculated gradient of 20.6 feet per 100 feet far exceeds topographic slope of the area and is unexpected based on proximity of the Mad River and low-elevation river terrace morphology of the area. Table 2 (Appendix B) summarizes cumulative groundwater gradient calculations. Groundwater gradient calculations for the site are not made if less than three monitoring wells provided gage data.

The five site monitoring wells at the former Dutra Trucking site were drilled during November 2003. At that time only MW-3, drilled to 15 feet within the tank excavation, produced sufficient water for sampling at a shallow depth. Monitoring well MW-2 was drilled to 20 feet at the eastern margin of the former underground storage tank (UST) excavation. Monitoring wells MW-1, MW-4 and MW-5 were initially drilled peripheral to the former tank excavation to the planned depth of 20 feet and then were deepened to 25 feet in an attempt to encounter the water table. With the fine-grained soils encountered at this site, it was deemed likely that water would eventually enter the site wells. Please refer to the site conceptual model included with this report for information used in the decision making process to determine well depth.

Across the approximately 100 feet between monitoring wells at this site, groundwater elevation can vary by greater than 15 feet. According to the March 2005 gage data, groundwater ranged from 7.66 to 11.75 feet below ground surface. Two of the wells were dry indicating that the water table in those locations was greater than 25 feet below ground surface. As the former Dutra Trucking site is nearly horizontal, these groundwater data may indicate that a perched condition is present for impounded water in the former UST excavation. This may explain the steep calculated groundwater gradients for this site.

Groundwater Sampling

On March 4, 2005, monitoring wells MW-2 and MW-3 were purged and sampled while MW-5 was sampled without purging. All monitoring well purging and sampling was performed in accordance with Winzler & Kelly SOPs (Appendix D). After purging at least three wetted casing volumes of water from monitoring wells MW-2 and MW-3, the water level was allowed to recover to approximately 80% of the pre-purge level before sampling. Monitoring wells MW-2 and MW-3 were sampled within 1 hour of purging.

Monitoring well MW-5 possibly contained enough water for purging prior to sampling, although the well has been suspected of having very slow recharge. This observation led to the decision to collect the water sample without purging.

As part of the quarterly groundwater monitoring program, groundwater samples collected from the site monitoring wells were analyzed for the following:

- Total Petroleum Hydrocarbons as Diesel (TPH-D) by EPA Method 3550;
- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) and Methyl Tertiary Butyl Ether (MTBE) by EPA Method 8021B;

Groundwater Analytical Results

A concentration of TPH-D was measured at 840 parts per billion (ppb) from groundwater samples obtained from monitoring well MW-2. A concentration of TPH-D was measured at 170 parts per billion (ppb) from groundwater samples obtained from monitoring well MW-3. Concentrations of all other constituents analyzed from monitoring wells MW-2, MW-3 and MW-5 were below laboratory detection limits. Laboratory analytical results have been submitted electronically to the State Water Resources Control Board (SWRCB) Geotracker System. Laboratory analytical results are presented in Table 3 (Appendix B). Copies of the laboratory analytical reports are included in Appendix C.

Disposition of Purge water

Purge water is currently being stored in 55-gallon drums on site pending disposal arrangements.

Quality Assurance/Quality Control (QA/QC)

Field QA/QC was provided by adherence to the Winzler & Kelly Standard Operating Procedures for "Monitor Well Purging and Sampling Activities", as contained in Appendix D.

Laboratory QA/QC was provided by the use of lab Method Blanks to preclude false positive analysis of analytes and the use of Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (LCSD) samples to evaluate the percentage recovery of target analytes and reproducibility during analysis.

The laboratory provided the following notes regarding QA/QC:

> TPH as Diesel:
> Samples MW-2 and MW-3 contains material similar to degraded or weathered diesel oil.
>
> The surrogate recoveries were above the upper acceptance limits for samples MW-2 and MW-3, the method blank and the laboratory control sample/laboratory control sample duplicate (LCS/LCSD). The LCS/LCSD recoveries for diesel were within the acceptance limits; therefore the data were accepted.
>
> BTEX:
> The surrogate recovery was below the lower acceptance limit for sample MW-2. The response of the reporting limit standard was such that the analyte would have been detected even with the low recovery; therefore, the data were accepted.
>
> The LCSD recovery was slightly below the lower acceptance limit for MTBE. The LCS recovery was within the acceptance limits; therefore, the data were accepted.
>
> The relative percent difference (RPD) for the laboratory control samples was above the upper acceptance limit for the surrogate. The RPDs for all the analytes were within acceptable limits; therefore, the data were accepted.

Discussion

Groundwater gradient was calculated to flow to the west (278 degrees) in March 2005 at 20.6 feet per 100 feet. It appears that groundwater gradient dips toward the Mad River during rainy months such as March 2005.

Groundwater quality outside the former UST excavation in MW-5 continues to contain no detectable dissolved contaminants. A detection of TPH-D in MW-2 of 840 ppb was the first time there has been any laboratory detection of any analyte in MW-2. Monitoring well MW-2 is located at the eastern margin of the tank pit. A shallow drainage ditch is present along the west margin of

Boyd Road and appears to receive runoff water from the road surface and some surrounding areas. This drainage ditch runs approximately on the same line as the north-south chain-link fence illustrated in Figure 2 detail. The drainage ditch appears to act as a percolation basin as there is no discharge outlet apparent. This drainage ditch may play a role in recharge of water to monitoring wells MW-2, MW-3 and MW-5 and possibly the former tank excavation.

Groundwater in the former UST excavation at MW-3 contained TPH-D at 170 ppb in March 2005, the lowest concentration recorded. The 2004 - 2005 TPH-D values (in ppb) for MW-3 are 320, 850, 9600, 170 (see Table 3 for dates). With high stands of water in the former UST excavation, comparison of similar season data (February 4, 2004 and March 4, 2005) indicate that TPH-D concentrations are improving with time (320 ppb 2004; 170 ppb 2005). Concentrations of TPH-D in the former UST excavation appear to increase with the lowest stands (9600 ppb, November 30, 2004). These TPH-D values may indicate that limited residual soil contamination remains in the margins of the remediated UST excavation. Residual impacts to soil continue to have effects on groundwater quality within the UST excavation. However, water within the former tank excavation appears to be perched and is not apparently correlative with groundwater of the area. Water with varying concentrations of TPH-D detected in MW-2 appears to be confined within the former tank excavation. There is no indication that this residual contamination is migrating beyond the confines of the former tank excavation.

Residual contamination in water appears to be restricted to the former tank excavation. Water does not appear to be migrating from the tank excavation toward the Mad River or toward a production well north of the former UST pit. This statement is made on the basis of no detectable contaminants found in groundwater from soil borings or monitoring wells MW-1, MW-4 or MW-5 in 2002 or 2005.

Conclusions

- Despite scheduling the March 2005 sampling event to follow a period of unusually heavy rainfall, only three of the five site monitoring wells contained adequate water for gaging and sampling.
- Gage data of groundwater from three wells was used to calculate groundwater flow to the west at 278° azimuth with a gradient of 20.6 feet per 100 feet.
- TPH-D was detected at a concentration of 840 and 170 parts per billion from groundwater samples obtained from monitoring wells MW-2 and MW-3 respectively, while all other constituents analyzed remained below laboratory detection limits at monitoring wells MW-2, MW-3, and MW-5.
- This sampling event is the first time TPH-D has been detected from MW-2.
- With the exception of TPH-D in MW-2 and MW-3, all analytes tested remained below laboratory detection limits in samples collected from monitoring wells MW-2, MW-3 and MW-5.

- Analytical data appears to indicate that diesel contamination is restricted to the within the former UST excavation.
- Impounded water within the former tank excavation appears to be perched does not appear to be representative of area groundwater conditions.

PROJECT SUMMARY

This report section provides data that will be useful to evaluate the former Dutra Trucking Property for regulatory closure. Project Summary documentation included here include a Site Conceptual Model, indicators of perched groundwater, data indicating that residual contamination appears to be stable and declining with time, a Sensitive Receptor Survey and recommendations for additional work. Your commentary or concurrence with our recommendations leading to regulatory closure will be appreciated.

Site Conceptual Model

The former Dutra Trucking property is located on an alluvial terrace of the Mad River in the northeastern portion of Arcata. On May 14 and 15, 1990, five fuel underground storage tanks (USTs) were removed from a common excavation at the Dutra property under closure permit #115889. The tank volumes and contents were indicated to be as follows:

TANK	VOLUME	CONTENTS
#1	7,500 gal	Gasoline
#2	6,300 gal	Diesel
#3	5,000 gal	Diesel
#4	10,000 gal	Diesel
#5	10,000 gal	Diesel

At that time, approximately 240 cubic yards of suspected contaminated material was removed from the excavation and stockpiled on the Dutra property for remediation. Following remedial excavation, eight confirmation samples were collected form the margins of the pit. Confirmation soil samples analyzed for TPH as diesel produced results ranging from 2.0 to 5.3 ug/g indicating that interim remediation work was effective. A copy of Winzler & Kelly's August 13, 1990, report of findings from the UST removal and remedial excavation is attached as Appendix F. The 240 cubic yards of excavated material was treated on-site, characterized to document effectiveness of treatment, and with regulatory approval was spread on the Dutra property.

No water was observed in the excavation at a maximum depth observed of approximately 17 feet below ground surface during 1990 tank removal and remedial excavation work. As stated in a letter from HCDEH dated June 29, 1994, "Information regarding groundwater levels at the site needs to be submitted in order to demonstrate that soil contamination did not impact groundwater quality."

Until 2002 this project was thought to be a "soils-only" investigation and no drilling to obtain groundwater data was performed. In January 2002, five borings were drilled within and surrounding

the former UST excavation to evaluate groundwater quality. These five borings were installed using solid stem auger equipment and small-diameter slotted well casings were left in the borings overnight to allow water sampling and estimation of groundwater gradient. Groundwater was measured in these borings at between 6 and 11 feet below ground surface the day after drilling. This depth to groundwater information was used to prepare the workplan to install monitoring wells. The depth to groundwater observed in the site's monitoring wells has been far deeper than the previously measured 6 to 11 feet from soil borings. A possible explanation for this is that the uncased borings drilled through the asphalt surface at the Dutra facility received water from the sub grade fill material. In contrast, the surface seal of the monitoring wells excludes water from this sub grade fill horizon.

From these five January 2002 borings, only one boring, B-3, produced low concentrations of diesel (180 ppb) from within the former UST pit. Per a directive from the HCDEH, groundwater was again sampled from an additional boring installed within two feet of the former B-3 location in December 2002 using Geoprobe sampling equipment. During this December 2002 sampling event, groundwater was found to contain 21,000 ppb as diesel and 6500 ppb as gasoline at the boring B-3 location. This increase in groundwater contaminant values from within the former UST excavation prompted the installation of five monitoring wells as depicted in Figure 2. One monitoring well, MW-3, is located in the location of Boring B-3 to sample groundwater from within the former UST excavation. The other four wells are located outside of the tank excavation and are positioned to evaluate groundwater upgradient, cross gradient, and down gradient of the former UST excavation.

The monitoring wells at the Dutra facility are 15 to 25 feet in depth. The depth of these wells was based on the results of initial soil boring work in January 2002 when groundwater was encountered in five soil borings at between six and eleven feet below ground surface. The three 25 foot deep wells, MW-1, MW-4 and MW-5 are west, northwest, and northeast of the former UST excavation and are typically dry. Monitoring well MW-3, drilled into imported backfill material within the former UST excavation is 15 feet deep and produces water during every site visit at depths ranging from 10.31 to 14.41 feet below ground surface. Monitoring well MW-2 is 20 feet deep and has produced water during each site visit at depths ranging from 7.55 to 13.53 feet below ground surface. Monitoring well MW-1, between the former UST excavation and the Mad River has produced groundwater once at a depth of 14.55 feet.

During the drilling of these five monitoring wells, groundwater was first encountered in three of the boreholes at approximately 16 feet below the ground surface. However, the 25 foot-deep completed wells installed in native soils north and west of the former UST excavation do not regularly produce water. The initial water observed at the time of well drilling may have been derived from sub-grade base material beneath the asphalt surface draining into the borehole, water added to the hole during the drilling process, or a temporary draining of water from the clayey-silty soils exposed during drilling.

The elevation of the Mad River at the point nearest the Dutra facility is between 15 and 20 feet in elevation, (USGS, Arcata North, 7.5 minute quadrangle) the elevation of the Dutra facility is

approximately 48 feet (Ontiveros Associates, survey data). Using these elevation data, the difference between grade elevation at the well heads and the river level is approximately 28 feet. Given that the Mad River is expected to be a gaining stream in this reach and the measured groundwater gradient is typically in a westerly direction at gradients ranging from 10 to 20 feet per 100 feet, it is expected that the 25 foot deep wells at this site should be of sufficient depth to penetrate the water table.

Subsurface soils encountered at this site below surficial fill material consist of clayey silt from approximately 3 feet to 18 feet below ground surface. Fine-grained sand and gravelly sand are encountered below approximately 18 feet. The soil logs from the five site wells are included in Appendix E.

Monitoring well MW-3 drilled into the former UST excavation is installed in well-graded sandy gravel interpreted to be compacted fill material within the former tank pit. The 15 foot soil sample from MW-3 encountered clayey silt, interpreted to be the approximate contact of fill material with native soils. The maximum depth of MW-3 was chosen at 15 feet to prevent possible cross-contamination of water in the former UST pit with deeper aquifers.

Perched Groundwater within former UST Excavation

Given the large variation in water table elevations recorded in the five site monitoring wells positioned within a 100 foot radius of one another, it is concluded that a perched ground water condition is present at the Dutra facility (Figure 2). All five wells are constructed on a flat terrace surface and have surveyed top of casing elevations of within 1.13 feet of one another (Table 1). Monitoring well MW-2 is located in the narrow strip of native soil between a drainage ditch alongside Boyd Road and the former UST excavation. Monitoring well MW-3 is installed within the former UST excavation. These two wells consistently produce water at depths no greater than 14.41 feet. Monitoring wells MW-1 and MW-4 are 25 feet deep installed in native soils, and do not regularly produce water indicating that the water table is deeper than 25 feet west and northwest of the former tank excavation. Water percolating from a drainage ditch along Boyd Road may be responsible for the elevated levels of groundwater in monitoring wells MW-2 and MW-3. It is possible that monitoring well MW-5 also receives recharge water from the Boyd Road drainage ditch.

The impounded water presumed to be perched within the former UST excavation results in very steep groundwater gradients calculated from gage data with slope directions ranging from west to northeast (Table 2) when compared to gage data from wells drilled into native soils. Given that the calculated slope of the water table is far in excess of the topography of the site and has been calculated to flow in a direction contrary to what site hydrology would dictate (May 2004, Table 2), it can be concluded that different bodies of groundwater are tapped by the five monitoring wells at the Dutra site. Water impounded within the former UST excavation does not appear to represent regional conditions. In May 2004, the calculated groundwater flow direction was away from the Mad River; while in March 2005, the calculated groundwater flow direction was toward the Mad River at gradients ranging from 10.3 to 20.6 feet per 100 feet.

Containment of Residual Contaminants

Water impounded within the former UST excavation at the Dutra Facility contains variable concentrations of TPH-D. Boring B-3 reconstructed as monitoring well MW-3 is located within the former UST excavation. Boring B-1 reconstructed as monitoring well MW-1 is located in native soils approximately 10 feet down gradient of the former UST excavation.

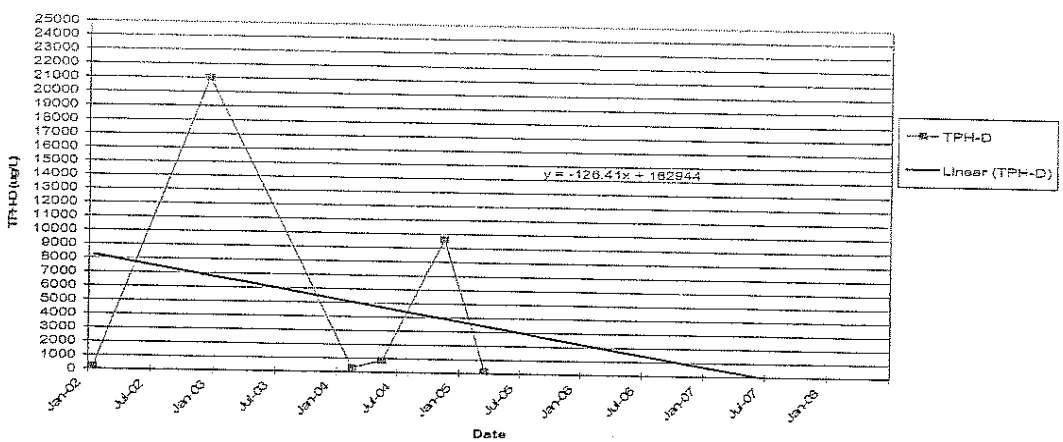
Water samples from boring B-1, sampled in January 2002 and monitoring well MW-1, sampled in February 2004 have produced no detectable results for TPH-D (Table 3). During the February 2004 sampling event, the elevation difference of water in MW-1 and MW-3 was 4.24 feet over a lateral distance of approximately 36 feet. Subsequent monitoring of MW-1 has not produced measurable groundwater indicated that the water table is deeper than 25 feet at this point.

The characteristics of water between MW-1, installed in native soils west of the former UST excavation and MW-3 installed within the former tank pit are significantly different in both contaminant characteristics and elevation. These observations lead to the conclusion that two discrete subsurface water bodies are tapped with these two wells. The water impounded in the former UST excavation does not appear to be continuous with the groundwater in the area of the former Dutra Facility and appears to effectively contain residual contaminants.

Degradation Rate of Residual Contaminants.

Analytical laboratory data for water samples evaluated for TPH-D from boring B-3 and monitoring well MW-3, located within the former UST excavation, were plotted against time to evaluate the trend of residual contaminants using data from January 2002 to March 2005 (Chart 1, below). The best-fit line for these data indicates that the concentration of TPH -D will reduce with time to a non-detectable level by approximately June 2007.

CHART 1
MW-3
Forecast Trend TPH-D



Sensitive Receptor Survey

As reported by Winzler & Kelly in a document dated February 23, 1994, all wells within the area of the former USTs were located and briefly described. Upon review of the site map included with this 1994 report, all wells within approximately 1000 feet of the former USTs were identified and described. On the "well Descriptions" page of the report 10 wells are descried with property addresses. On the attached site map, wells #1 through #7 are identified. The addresses of wells #8, #9, and #10 indicate that they are located off the map further north along Boyd Road. From this report and recent field observations, no wells are located in the down gradient westerly direction between the former USTs and the Mad River. Production wells in this area range in depth from 18 to 75 feet in depth. None of these wells is believed to be used for potable purposes. A copy of the report including the well survey is included in Appendix F.

The term "Sensitive Receptor Survey" had not yet been coined in 1994 so this research does not state that the Mad River is an obvious sensitive receptor within approximately 500 feet west of the former UST location. The area of Arcata containing the former Dutra Trucking facility is used for industrial and commercial purposes. Freeway 299 is located approximately 250 feet east of the former Dutra Facility. No schools, day care facilities, care homes or facilities designed for individuals with acute environmental sensitivities were found in this area. No natural surface water bodies are known to flow in the vicinity of the former Dutra Facility with the obvious exception of the Mad River.

Project Findings Supporting Regulatory Closure of This Property

- USTs have been removed from this site under HCDEH permit. The tank excavation has been successfully remediated based on soil confirmation sample data. Low level diesel fuel contamination in soil peripheral to remedial excavation apparently continues to affect impounded water within the former excavation.
- Extent of contamination is defined and appears to be restricted to impounded water within the former UST excavation.
- Based on lab data, residual TPH as diesel in impounded water in former tank exaction will naturally degrade to non-detectable levels by approximately June 2007.
- Subsurface soils encountered at this site below surficial fill material consist of clayey silt from approximately 3 feet to18 feet below ground surface. Fine-grained sand and gravelly sand are encountered below approximately 18 feet.
- Depth to impounded water within the former UST excavation is not representative of groundwater in the remainder of the former Dutra facility.
- Water samples from Boring #1 and Well MW-1, positioned approximately 10 feet down gradient (west) of the former UST excavation, are free of detectable contaminants based laboratory data.
- Water samples from Borings #4 and #5 and monitoring wells MW-4 and MW-5 are located north of the former UST excavation between the tank pit and a production

well used for truck washing. No contamination has been detected from borings or wells in these locations, indicating that pumping of the on-site production well does not appear to be inducing migration of impacted groundwater impounded in the former UST excavation.

Recommendations

- To confirm that groundwater has not been impacted from water impounded in the former tank excavation, deepen monitoring wells MW-1 and MW-4 to access the first aquifer beneath the site. Groundwater data from the MW-1 location will provide data on groundwater in the down gradient direction from the former UST excavation. Groundwater data from MW-4 will determine if residual contaminants are migrating toward the production well located north of the former UST excavation (production well is illustrated at northeast comer of Figure 2).
- Contamination was first detected in monitoring well MW-2 during the March 2005 sampling event. Continue periodic sampling of MW-2, to provide additional data on contamination from this well.
- Continue periodic sampling of MW-3 within the former UST excavation to confirm the declining trend of TPH-D concentration.
- Request water samples for TPH-D laboratory analysis with and without silica gel cleanup.
- Prepare soil and groundwater contingency plan.
- Properly dispose of all remaining drummed investigation-derived wasted on site.

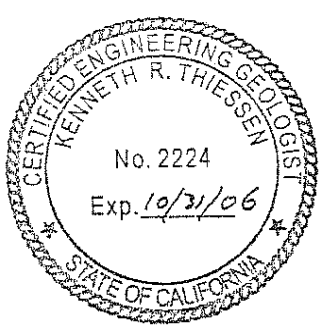
I look forward to your commentary or concurrence with the recommendations provided in this report.

If you have any questions or comments, please do not hesitate to call.

Sincerely,
WINZLER & KELLY

Kenneth Thiessen, CEG #2224
Certified Engineering Geologist

tp



Attachments: Appendix A: Figures
Figure 1 Site Vicinity Map
Figure 2 Gradient Site Map
Appendix B: Tables and Chart
Table 1 Groundwater Level Measurements
Table 2 Groundwater Gradient Data
Table 3 Groundwater Analytical Results
Appendix C: Laboratory Analytical Reports
Appendix D: Standard Operating Procedures
Appendix E: Field Notes
Appendix F: Winzler & Kelly historical reports, well logs

c: Mr. Frank Dutra
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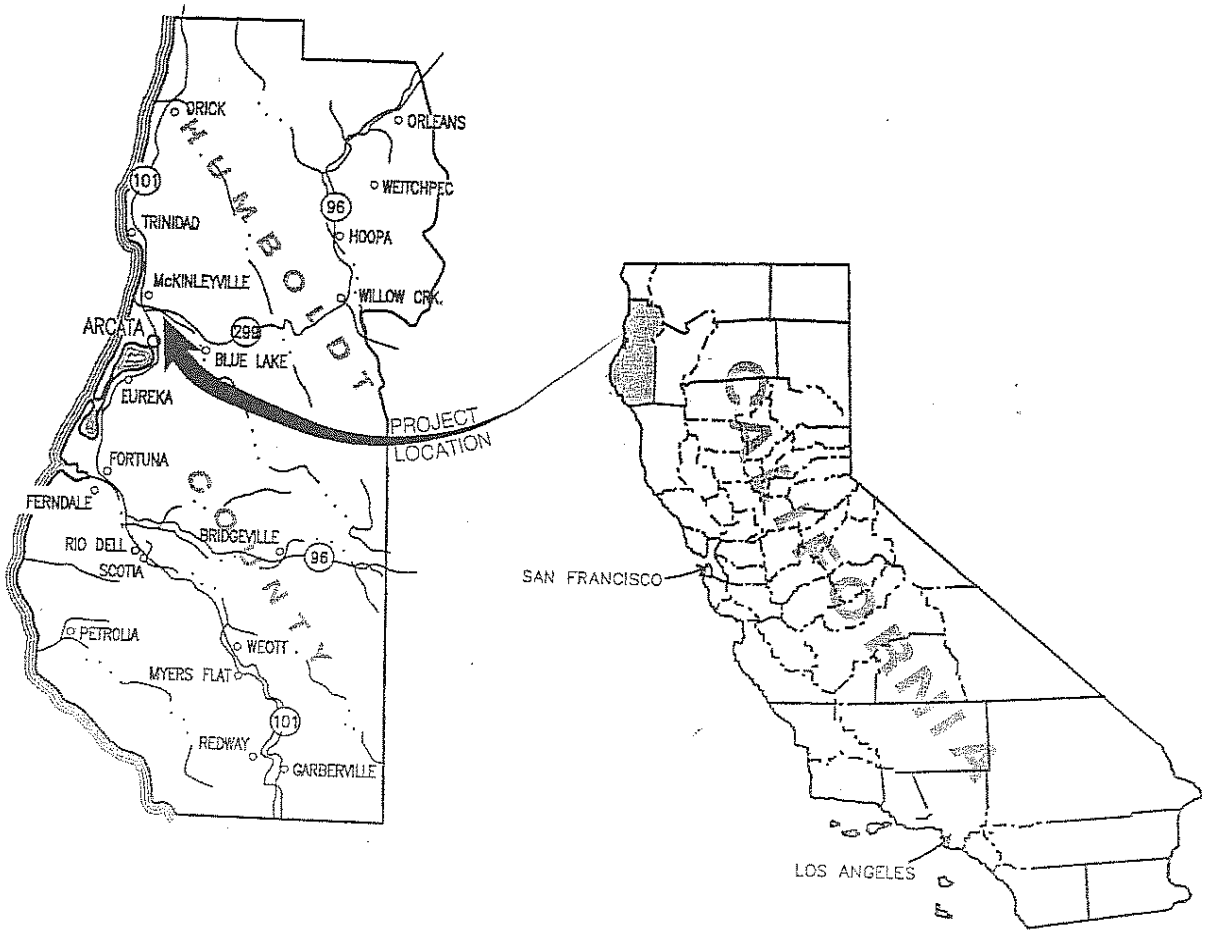
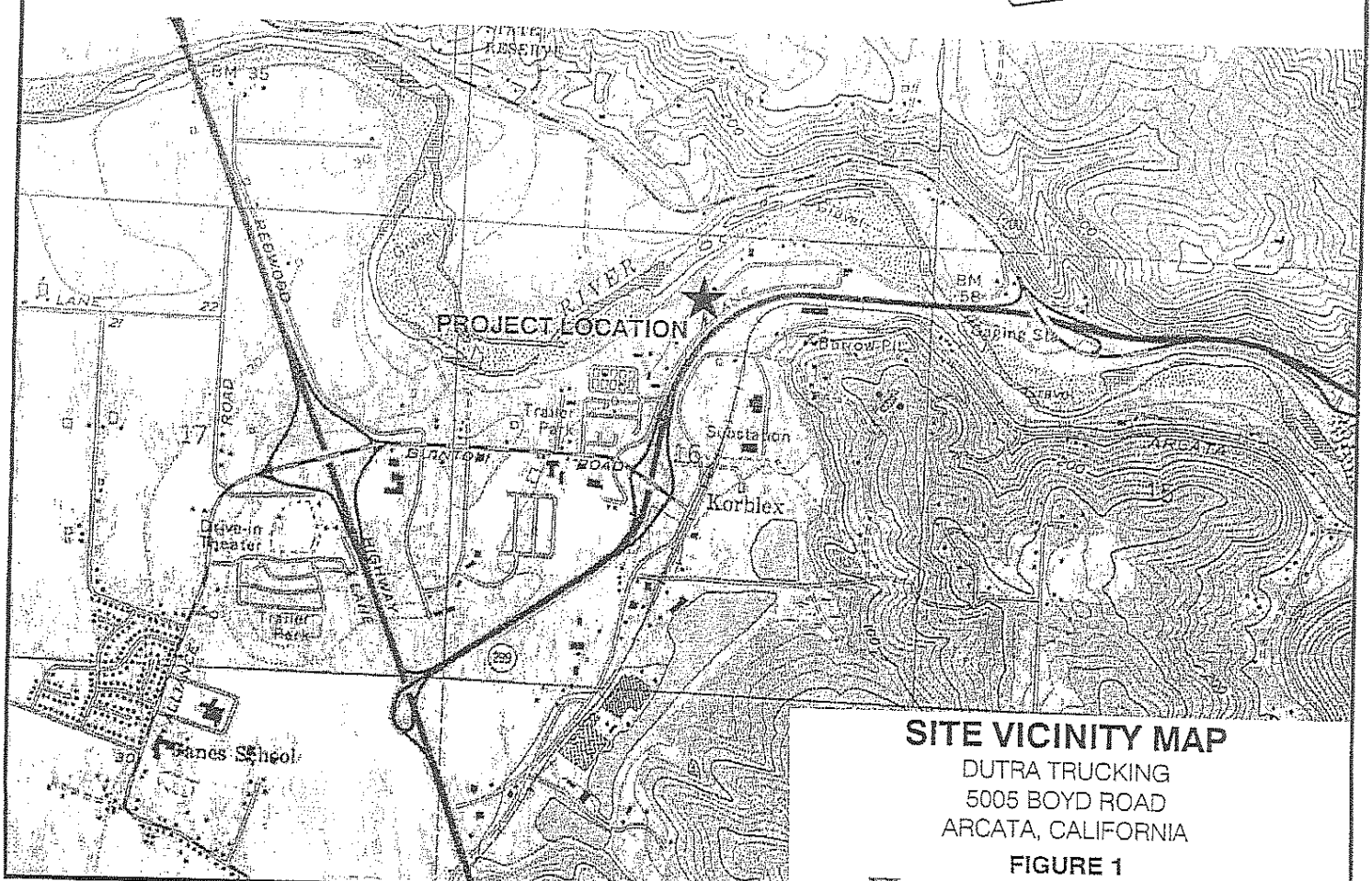
Willow Creek, California 95573

Appendix A

Figures





SITE VICINITY MAP

DUTRA TRUCKING
5005 BOYD ROAD
ARCATA, CALIFORNIA

FIGURE 1

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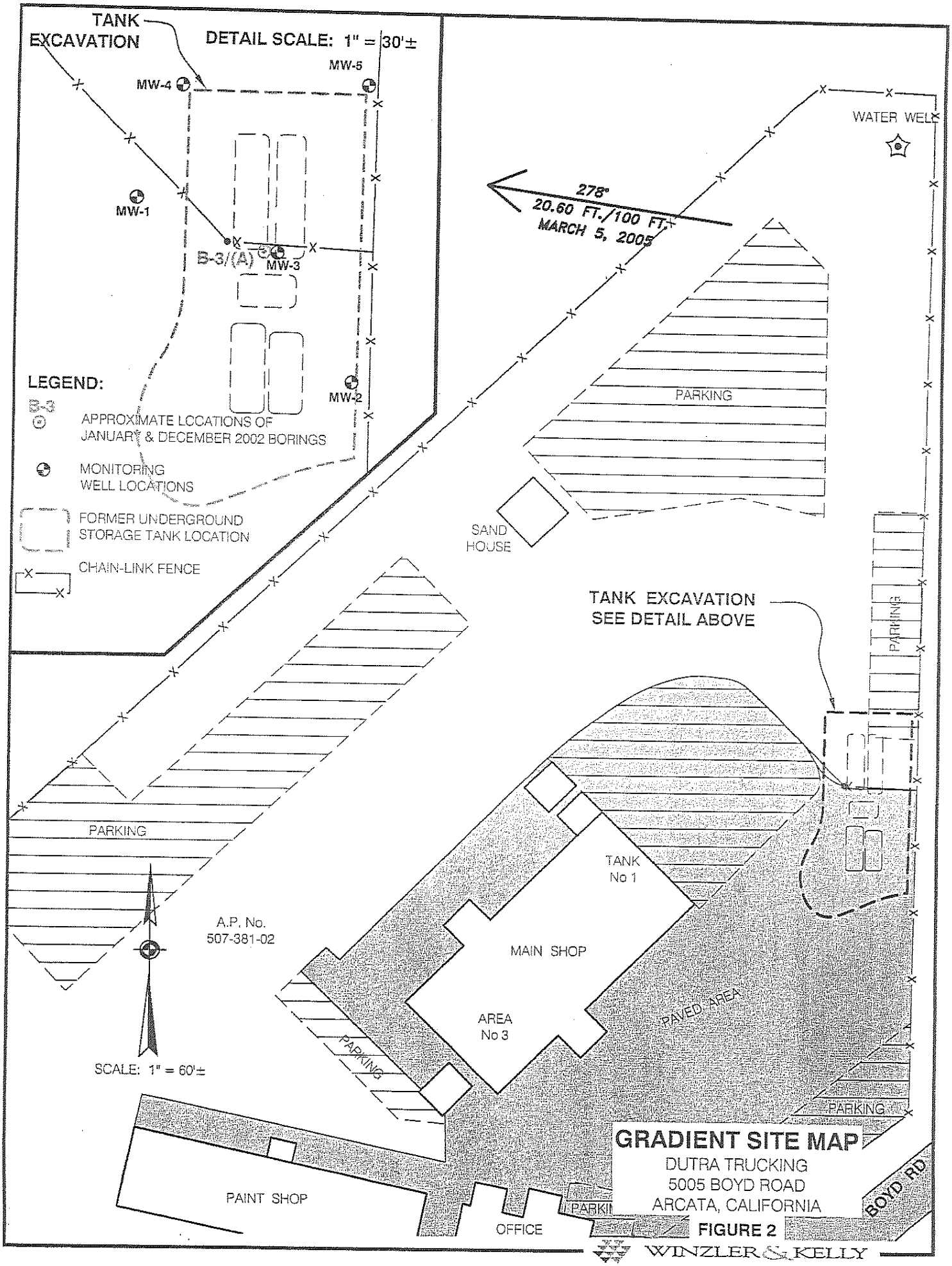

GRADIENT SITE MAP

DUTRA TRUCKING
5005 BOYD ROAD
ARCATA, CALIFORNIA

FIGURE 2

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Appendix B
Tables & Chart

TABLE 1
GROUNDWATER LEVEL MEASUREMENTS
Former Dutra Trucking, LOP #12264

Well Number	Date	Groundwater Elevation (ft)	Top of Casing (ft)	A Depth to Water (ft)	B Depth to Product (ft)	(A-B=C) Product Thickness (ft)	D Correction Factor (C x 0.729*)	A-D Equivalent Depth to Water (ft)
MW-1	4-Feb-04	33.48	48.03	14.55	0.00	0.00	0.00	14.55
	3-May-04	DRY	48.03	DRY	DRY	DRY	DRY	DRY
	30-Nov-04	DRY	48.03	DRY	DRY	DRY	DRY	DRY
	4-Mar-05	DRY	48.03	DRY	DRY	DRY	DRY	DRY
MW-2	4-Feb-04	39.94	47.49	7.55	0.00	0.00	0.00	7.55
	3-May-04	34.49	47.49	13.00	0.00	0.00	0.00	13.00
	30-Nov-04	33.96	47.49	13.53	0.00	0.00	0.00	13.53
	4-Mar-05	39.83	47.49	7.66	0.00	0.00	0.00	7.66
MW-3	4-Feb-04	37.49	47.80	10.31	0.00	0.00	0.00	10.31
	3-May-04	35.35	47.80	12.45	0.00	0.00	0.00	12.45
	30-Nov-04	33.39	47.80	14.41	0.00	0.00	0.00	14.41
	4-Mar-05	36.05	47.80	11.75	0.00	0.00	0.00	11.75
MW-4	4-Feb-04	DRY	48.54	DRY	DRY	DRY	DRY	DRY
	3-May-04	DRY	48.54	DRY	DRY	DRY	DRY	DRY
	30-Nov-04	DRY	48.54	DRY	DRY	DRY	DRY	DRY
	4-Mar-05	DRY	48.54	DRY	DRY	DRY	DRY	DRY
MW-5	4-Feb-04	40.06	48.62	8.56	0.00	0.00	0.00	8.56
	3-May-04	30.17	48.62	18.45	0.00	0.00	0.00	18.45
	30-Nov-04	DRY	48.62	DRY	DRY	DRY	DRY	DRY
	4-Mar-05	38.52	48.62	10.10	0.00	0.00	0.00	10.10

*0.729 is the density of gasoline at 15oC as referenced in the API Publication 1628, Second Edition, August, 1989
NA Not applicable

Table 2
Groundwater Gradient Data
Former Dutra Trucking, LOP #12264

Date	Gradient Direction (degrees Azimuth)	Gradient Magnitude (ft./100 ft.)
1/29/2002 *	Northwest (293.5)	10.3
2/04/2004 **	West (271)	12.53
5/03/2004 **	Northeast (71)	16
11/30/2004****	Insufficient data	Insufficient data
3/4/2005**	West (278)	20.6

* Gradient direction and magnitude based upon gage data from soil borings; not a product of survey.
** Gradient direction and magnitude based upon permanent monitoring well locations and survey information.
**** Gradient direction and magnitude could not be calculated due to lack of water in three of the five wells.

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
Former Dutra Trucking, LOP #12264

(All units reported in parts per billion)

Sample ID	Sample Date	TPH as Diesel (ppb)	TPH as Motor Oil (ppb)	TPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	(MTBE) Methyl Tertiary Butyl Ether (ppb)	(DIPE) Di-isopropyl Ether (ppb)	(ETBE) Ethyl Tertiary Butyl Ether (ppb)	(TAME) Tertiary Amyl Methyl Ether (ppb)	(TBA) Tertiary Butyl Alcohol (ppb)	(1,2 DCB) 1,2-Dichloro benzene (ppb)	(1,3 DCB) 1,3-Dichloro benzene (ppb)	(1,4 DCB) 1,4-Dichloro benzene (ppb)	(1,2 DCA) 1,2-Dichloro ethane (ppb)	(EDB) 1,2-Dibromo methane (ppb)	Chloro benzene (ppb)
SUBSURFACE INVESTIGATION JAN. & DEC. 2002																			
B1	28-Jan-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B2	28-Jan-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B3	29-Jan-02	180	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B4	29-Jan-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B5	29-Jan-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Domestic Well	29-Jan-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B3	30-Dec-02	21,000	6,500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HYDROGEOLOGIC INVESTIGATION, FEB. 2004 MONITORING EVENT																			
MW-1	4-Feb-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
MW-2	4-Feb-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
MW-3	4-Feb-04	320	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
MW-4	4-Feb-04	DRY																	
MW-5	4-Feb-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
MAY 2004 GROUNDWATER MONITORING EVENT																			
MW-1	3-May-04	DRY																	
MW-2	3-May-04	ND	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	3-May-04	850	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4	3-May-04	DRY																	
MW-5	3-May-04	ND	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NOVEMBER 2004 GROUNDWATER MONITORING EVENT																			
MW-1	30-Nov-04	DRY																	
MW-2	30-Nov-04	ND	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	30-Nov-04	9,600	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4	30-Nov-04	DRY																	
MW-5	30-Nov-04	DRY																	
MARCH 2005 GROUNDWATER MONITORING EVENT																			
MW-1	4-Mar-05	DRY																	
MW-2	4-Mar-05	840	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	4-Mar-05	170	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4	4-Mar-05	DRY																	
MW-5	4-Mar-05	ND	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

ND Not Detected
NA Not Analyzed
DRY no water in well

Appendix C

Laboratory Reports

NORTH COAST
LABORATORIES LTD.

March 16, 2005

Winzler and Kelly
633 Third Street
Eureka, CA 95501

Attn: Ken Thiessen

RE: 90129801.049, Dutra Trucking

Order No.: 0503149
Invoice No.: 48804
PO No.:

ELAP No. 1247-Expires July 2006

SAMPLE IDENTIFICATION

Fraction	Client Sample Description
01A	MW-5
01B	MW-5
02A	MW-2
02B	MW-2
03A	MW-3
03B	MW-3

ND = Not Detected at the Reporting Limit

Limit = Reporting Limit

All solid results are expressed on a wet-weight basis unless otherwise noted.

REPORT CERTIFIED BY

Laboratory Supervisor(s)

QA Unit

Jesse G. Chaney, Jr.
Laboratory Director

5680 West End Road • Arcata California 95521-9202 • 707-822-4649 • FAX 707-822-6831

CLIENT: Winzler and Kelly
Project: 90129801.049, Dutra Trucking
Lab Order: 0503149

CASE NARRATIVE

TPH as Diesel:
Samples MW-2 and MW-3 contain material similar to degraded or weathered diesel oil.

The surrogate recoveries were above the upper acceptance limit for samples MW-2, MW-3, the method blank and the laboratory control sample/laboratory control sample duplicate (LCS/LCSD). The LCS/LCSD recoveries for diesel were within the acceptance limits; therefore, the data were accepted.

BTEX:
The surrogate recovery was below the lower acceptance limit for sample MW-2. The response of the reporting limit standard was such that the analyte would have been detected even with the low recovery; therefore, the data were accepted.

The LCSD recovery was slightly below the lower acceptance limit for MTBE. The LCS recovery was within the acceptance limits; therefore, the data were accepted.

The relative percent difference (RPD) for the laboratory control samples was above the upper acceptance limit for the surrogate. The RPD's for all of the analytes were within the acceptance limits; therefore, the data were accepted.

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Date: 16-Mar-05
WorkOrder: 0503149

ANALYTICAL REPORT

Client Sample ID: MW-5
Lab ID: 0503149-01A

Received: 3/4/05 **Collected:** 3/4/05 9:45

Test Name: TPH as Diesel

Reference: EPA 3510/GCFID(LUFT)/EPA 8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	ND	50	µg/L	1.0	3/10/05	3/11/05
Surrogate: N-Tricosane	106	27.6-107	% Rec	1.0	3/10/05	3/11/05

Client Sample ID: MW-5
Lab ID: 0503149-01B

Received: 3/4/05 **Collected:** 3/4/05 9:45

Test Name: BTEX

Reference: EPA 5030/EPA 8021B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
MTBE	ND	3.0	µg/L	1.0		3/13/05
Benzene	ND	0.50	µg/L	1.0		3/13/05
Toluene	ND	0.50	µg/L	1.0		3/13/05
Ethylbenzene	ND	0.50	µg/L	1.0		3/13/05
m,p-Xylene	ND	0.50	µg/L	1.0		3/13/05
o-Xylene	ND	0.50	µg/L	1.0		3/13/05
Surrogate: Cis-1,2-Dichloroethylene	89.5	85-115	% Rec	1.0		3/13/05

Test Name: TPH as Gasoline

Reference: EPA 5030/GCFID(LUFT)/EPA 8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gas (C6-C14)	ND	50	µg/L	1.0		3/13/05

Client Sample ID: MW-2
Lab ID: 0503149-02A

Received: 3/4/05 **Collected:** 3/4/05 10:30

Test Name: TPH as Diesel

Reference: EPA 3510/GCFID(LUFT)/EPA 8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	840	50	µg/L	1.0	3/10/05	3/11/05
Surrogate: N-Tricosane	118	27.6-107	% Rec	1.0	3/10/05	3/11/05

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Date: 16-Mar-05
WorkOrder: 0503149

ANALYTICAL REPORT

Client Sample ID: MW-2
Lab ID: 0503149-02B
Received: 3/4/05 **Collected:** 3/4/05 10:30

Test Name: BTEX
Reference: EPA 5030/EPA 8021B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
MTBE	ND	3.0	µg/L	1.0		3/13/05
Benzene	ND	0.50	µg/L	1.0		3/13/05
Toluene	ND	0.50	µg/L	1.0		3/13/05
Ethylbenzene	ND	0.50	µg/L	1.0		3/13/05
m,p-Xylene	ND	0.50	µg/L	1.0		3/13/05
o-Xylene	ND	0.50	µg/L	1.0		3/13/05
Surrogate: Cis-1,2-Dichloroethylene	81.1	85-115	% Rec	1.0		3/13/05

Test Name: TPH as Gasoline
Reference: EPA 5030/GCFID(LUFT)/EPA 8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gas (C6-C14)	ND	50	µg/L	1.0		3/13/05

Client Sample ID: MW-3
Lab ID: 0503149-03A
Received: 3/4/05 **Collected:** 3/4/05 11:00

Test Name: TPH as Diesel
Reference: EPA 3510/GCFID(LUFT)/EPA 8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	170	50	µg/L	1.0	3/10/05	3/11/05
Surrogate: N-Tricosane	111	27.6-107	% Rec	1.0	3/10/05	3/11/05

Client Sample ID: MW-3
Lab ID: 0503149-03B
Received: 3/4/05 **Collected:** 3/4/05 11:00

Test Name: BTEX
Reference: EPA 5030/EPA 8021B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
MTBE	ND	3.0	µg/L	1.0		3/13/05
Benzene	ND	0.50	µg/L	1.0		3/13/05
Toluene	ND	0.50	µg/L	1.0		3/13/05
Ethylbenzene	ND	0.50	µg/L	1.0		3/13/05
m,p-Xylene	ND	0.50	µg/L	1.0		3/13/05
o-Xylene	ND	0.50	µg/L	1.0		3/13/05
Surrogate: Cis-1,2-Dichloroethylene	91.0	85-115	% Rec	1.0		3/13/05

Test Name: TPH as Gasoline
Reference: EPA 5030/GCFID(LUFT)/EPA 8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gas (C6-C14)	ND	50	µg/L	1.0		3/13/05

NORTH COAST LABORATORIES
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North Coast Laboratories, Ltd.

Date: 16-Mar-05

CLIENT: Winzler and Kelly
Work Order: 0503149
Project: 90129801.049, Dutra Trucking

QC SUMMARY REPORT
Method Blank

Sample ID **MB-3/12/05** Batch ID: **R33857** Test Code: BTXEW Units: µg/L Analysis Date **3/12/05 11:01:37 PM** Prep Date
Client ID: Run ID: ORGC8_050312B SeqNo: 489830

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
MTBE	ND	3.0									
Benzene	ND	0.50									
Toluene	ND	0.50									
Ethylbenzene	ND	0.50									
m,p-Xylene	ND	0.50									
o-Xylene	ND	0.50									
Cis-1,2-Dichloroethylene	0.859	0.10	1.00	0	85.9%	85	115	0			

Sample ID **MB-3/12/05** Batch ID: **R33855** Test Code: TPHCGW Units: µg/L Analysis Date **3/12/05 11:01:37 PM** Prep Date
Client ID: Run ID: ORGC8_050312A SeqNo: 489801

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Gas (C6-C14)	ND	50									

Sample ID **MB-13136** Batch ID: **13136** Test Code: TPHDIW Units: µg/L Analysis Date **3/11/05 1:08:05 PM** Prep Date **3/10/05**
Client ID: Run ID: ORGC7_050311A SeqNo: 490133

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Diesel (C12-C22)	ND	50									
N-Tricosane	60.7	0.10	50.0	0	121%	28	107	0			S

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

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North Coast Laboratories, Ltd.

Date: 16-Mar-05

CLIENT: Winzler and Kelly
Work Order: 0503149
Project: 90129801.049, Dutra Trucking

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID **LCS-05177** Batch ID: **R33857** Test Code: **BTXEW** Units: **µg/L** Analysis Date **3/12/05 8:08:24 PM** Prep Date
Client ID: Run ID: **ORGC8_050312B** SeqNo: **489829**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
MTBE	36.18	3.0	40.0	0	90.4%	85	115	0			
Benzene	4.911	0.50	5.00	0	98.2%	85	115	0			
Toluene	4.973	0.50	5.00	0	99.5%	85	115	0			
Ethylbenzene	4.697	0.50	5.00	0	93.9%	85	115	0			
m,p-Xylene	9.438	0.50	10.0	0	94.4%	85	115	0			
o-Xylene	4.641	0.50	5.00	0	92.8%	85	115	0			
Cis-1,2-Dichloroethylene	1.13	0.10	1.00	0	113%	85	115	0			

Sample ID **LCSD-05177** Batch ID: **R33857** Test Code: **BTXEW** Units: **µg/L** Analysis Date **3/13/05 5:55:01 AM** Prep Date
Client ID: Run ID: **ORGC8_050312B** SeqNo: **489840**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
MTBE	33.03	3.0	40.0	0	82.6%	85	115	36.2	9.09%	15	S
Benzene	4.637	0.50	5.00	0	92.7%	85	115	4.91	5.74%	15	
Toluene	4.680	0.50	5.00	0	93.6%	85	115	4.97	6.07%	15	
Ethylbenzene	4.417	0.50	5.00	0	88.3%	85	115	4.70	6.14%	15	
m,p-Xylene	8.861	0.50	10.0	0	88.6%	85	115	9.44	6.31%	15	
o-Xylene	4.361	0.50	5.00	0	87.2%	85	115	4.64	6.22%	15	
Cis-1,2-Dichloroethylene	0.938	0.10	1.00	0	93.8%	85	115	1.13	18.9%	15	R

Sample ID **LCS-05178** Batch ID: **R33855** Test Code: **TPHCGW** Units: **µg/L** Analysis Date **3/12/05 9:17:49 PM** Prep Date
Client ID: Run ID: **ORGC8_050312A** SeqNo: **489800**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Gas (C6-C14)	505.2	50	500	0	101%	81	126	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

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NORTH COAST LABORATORIES

CLIENT: Winzler and Kelly
Work Order: 0503149
Project: 90129801.049, Dutra Trucking

QC SUMMARY REPORT
Laboratory Control Spike Duplicate

Sample ID **LCSD-05178** Batch ID: **R33855** Test Code: TPHCGW Units: µg/L Analysis Date **3/13/05 6:29:22 AM** Prep Date
Client ID: Run ID: ORGC8_050312A SeqNo: 489811

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Gas (C6-C14)	499.5	50	500	0	99.9%	81	126	505	1.13%	15	

Sample ID **LCS-13136** Batch ID: **13136** Test Code: TPHDIW Units: µg/L Analysis Date **3/11/05 10:51:00 AM** Prep Date **3/10/05**
Client ID: Run ID: ORGC7_050311A SeqNo: 490130

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Diesel (C12-C22)	453.1	50	500	0	90.6%	80	120	0			
N-Tricosane	58.0	0.10	50.0	0	116%	28	107	0			S

Sample ID **LCSD-13136** Batch ID: **13136** Test Code: TPHDIW Units: µg/L Analysis Date **3/11/05 11:54:19 AM** Prep Date **3/10/05**
Client ID: Run ID: ORGC7_050311A SeqNo: 490131

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Diesel (C12-C22)	478.7	50	500	0	95.7%	80	120	453	5.50%	15	
N-Tricosane	61.2	0.10	50.0	0	122%	28	107	58.0	5.41%	15	S

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

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P. 1 of 1

Chain of Custody

LABORATORY NUMBER: 0903149

Attention: Ken Thiessen
Results & Invoice to: Winzler & Kelly
Address: 633 Third St
Eureka, CA 95501
Phone: 443 9326
Copies of Report to:
Sampler (Sign & Print): Gary Lester Gary Lester

TAT: ☐ 24 Hr ☐ 48 Hr ☐ 5 Day ☐ 5–7 Day
☒ STD (2–3 Wk) ☐ Other:
PRIOR AUTHORIZATION IS REQUIRED FOR RUSHES

REPORTING REQUIREMENTS: State Forms ☐
Preliminary: FAX ☐ Verbal ☐ By: __/__/__
Final Report: FAX ☐ Verbal ☐ By: __/__/__

PROJECT INFORMATION
Project Number: 90129801.049
Project Name: Dutra Trucking
Purchase Order Number:

LAB ID	SAMPLE ID	DATE	TIME	MATRIX*	CONTAINER	PRESERVATIVE	ANALYSIS
	MW-5	3/4/05	0945	GW	1	HCl	TPH-D
	MW-2	"	1030	"	3	"	BTEX, MTBE
	MW-3	"	1100	"	3	"	"

ANALYSIS: TPH-D; BTEX, MTBE; TPH-Gas and Ken T/Dark 3/8/05

CONTAINER CODES: 1—½ gal. pl; 2—250 ml pl; 3—500 ml pl; 4—1 L Nalgene; 5—250 ml BG; 6—500 ml BG; 7—1 L BG; 8—1 L cg; 9—40 ml VOA; 10—125 ml VOA; 11—4 oz glass jar; 12—8 oz glass jar; 13—brass tube; 14—other

PRESERVATIVE CODES: a—HNO_3; b—HCl; c—H_2SO_4; d—$Na_2S_2O_3$; e—NaOH; f—$C_2H_3O_2Cl$; g—other

SAMPLE CONDITION/SPECIAL INSTRUCTIONS
TPH-D by 3550
BTEX, MTBE by 8021
evidence of cooling 4.4°C
Geotracker: per Ken, 3/8/05 - T0600230801 ET

RELINQUISHED BY (Sign & Print)	DATE/TIME	RECEIVED BY (Sign)	DATE/TIME
Gary D. Lester	3/4/05 1200 PM	(Signature)	3/4/05
GARY LESTER			

SAMPLE DISPOSAL
☐ NCL Disposal of Non-Contaminated
☐ Return ☐ Pickup

CHAIN OF CUSTODY SEALS Y/N/NA
SHIPPED VIA: UPS Air-Ex Fed-Ex Bus Hand

*MATRIX: DW=Drinking Water; Eff=Effluent; Inf=Influent; SW=Surface Water; GW=Ground Water; S=Soil; O=Other.

ALL CONTAMINATED NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

Appendix D

Winzler & Kelly SOP's

WINZLER & KELLY CONSULTING ENGINEERS

STANDARD OPERATING PROCEDURES
for
MONITOR WELL PURGING AND SAMPLING ACTIVITIES

1.0 OBJECTIVE

To establish accepted procedures for the purging and sampling groundwater from monitoring wells, to ensure that representative samples of formation water are collected by accepted methods.

1.1 Background

To obtain a representative groundwater sample from monitor wells, it is necessary to remove (purge) stagnant water from within and near the well prior to sampling. In general, three to seven casing volumes must be removed from the well prior to sampling, to provide a representative sample. Wells may be sampled after purging less than the minimum three volumes if well recharge rates are beyond reasonable time constraints. The specific method of well purging will be decided on a case by case basis, or as required by project specifications.

1.2 Personnel Required and Responsibilities

Project Manager: The Project Manager (PM) is responsible for ensuring that field personnel have been trained in the use of these procedures and for verifying that monitoring well purging and sampling activities are performed in compliance with these SOP's.

Field Technician: The Field Technician is responsible for complying with these SOP's, including the purging and sampling of monitor wells, the safe containerization of extracted waters, the documentation of field procedures, and the handling of samples..

2.0 WELL PURGING ACTIVITIES

2.1 Equipment Required

- Bottom-filling bailer, suction air pump, air-lift pump, gas operated (bladder) pump, submersible pump, or other pumping device
- pH meter
- Conductivity/Temperature Meter
- Water Level Indicator
- Well Sampling Data Sheet
- Indelible marker
- Disposable gloves
- Containers to hold extracted water (as required)

2.2. Purging Procedure

Prior to groundwater sampling, each monitoring well will be purged as described below. Prior to insertion into each well, all equipment will be either decontaminated (following W&K Decontamination procedures) or will be deemed clean or previously unused by the manufacturer.

- Open all monitoring wells to be purged and allow to equilibrate 5 to 15 minutes. Record time and visual observations regarding well access, condition, security, etc. in log book.
- Obtain depth to groundwater level readings according to Winzler & Kelly Standard Operating Procedures for Groundwater Level measurements and Free Phase Hydrocarbon Measurements. Record time and readings on the Well Level Measurement Data Sheet.
- Calculate the volume of standing water in each monitoring well. Record the volume calculated for each well on the Well Sampling Data Sheet.
- Begin purging the well by removing water from the well and collecting in a calibrated container (i.e., 5-gallon bucket marked in 1-gallon increments). The depth, or interval, from which the water is being purged should be noted on the data sheet.
- Obtain readings of field parameters (pH, conductivity, temperature, and turbidity) and make visual observations of color/odor/turbidity at selected intervals (i.e., every gallon, every five gallons, etc.) throughout the purging process. Depending on the calculated volume and the expected number of gallons to be purged, a minimum of five readings should be collected. Record the time, readings, and visual comments on the Purge Data Sheet.
- Continue purging until at least three (minimum) to four well volumes have been removed and the field parameters stabilize to within:

pH	~0.1
conductivity	~10%
turbidity	~10%
temperature	~1°

  Do not exceed seven well volumes.
- Obtain a final depth to groundwater level measurement prior to collection of the groundwater sample and note the reading and time on the Well Level Measurement Data Sheet. Be sure that the measurement probe has been thoroughly decontaminated prior to insertion into each well. Note any qualitative comments regarding recharge rate of each well, and calculate the percent of the original water column that has recovered at the time of the final depth measurement. It is ideal to attain a minimum of 80% water level recovery prior to sampling, if time constraints allow. Very slow recharge rates may not allow purging the minimum three volumes or 80% recovery; lesser volumes may be used for sampling, as needed and documented.
- Collect a groundwater sample following the directions below under Section 3.0.

- Containerize all purge water and decontamination water in 55-gallon drums. Use yellow indelible markers (storeroom supply) to label all drums on the side with date, contents, origin and other pertinent information. Avoid marking the tops of drums with black marker, such marks are temporary and will soon fade/rust. Note the number, condition and location of drums on site in the field notes.

3.0 WELL SAMPLING ACTIVITIES

3.1 Equipment Required

- Disposable bailer (previously unused) *
- Bottom emptying device (sampling port)
- Monofilament nylon line (min 40-lb test)
- Monitor Well Purge & Sample Data Sheets
- Sample containers (preserved, as required) - provided by the laboratory
- Sample labels
- Indelible marker
- Disposal gloves
- Decontamination soap (Alconox)
- Distilled water for equipment decontamination.

*A variety of sampling techniques are available for the collection of groundwater samples. Except where otherwise required, W&K only utilizes disposable polyethylene bailers to collect groundwater samples.

3.2. Sampling Procedure

Prior to collecting a groundwater sample from a monitoring well, each well must be properly purged in accordance with W&K's SOP for Monitoring Well Purging Activities (See Section 2.0 above), including the measurement of the final water level and documentation of recharge.

- Water from the desired screen interval will be collected by lowering the previously unused disposable, polyethylene, bottom-filling bailer into the well.
- When bailer is completely full, carefully retract the bailer from the well casing.
- Using a previously unused, new, bottom-emptying device, to minimize agitation of the water, transfer the water from the bailer to the sample containers.
- When sampling for volatile constituents (VOA's), the water samples will be collected in 40-ml glass vials (preserved as required by the analyses requested). Precautions will be taken to prevent capturing air bubbles in the vials.
- Upon filling, each vial will be immediately capped with a Teflon septum and plastic screw cap. The vial will be checked for air bubbles by inverting and gently tapping the vial. If any bubbles are visible, the vial will be refilled and confirmed to be free of any air bubbles.

- At a minimum, all samples will be labeled with the following information:

Sample ID	Date and Time Sample Collected
Location	Sampler's Initials
Project Number	Analyses Requested

- Sample information will be documented on the Chain-of-Custody form. All samples will be placed in an ice chest, chilled to a temperature of 4°C. The ice chest will remain in the custody of the sampler until it is transferred to the courier service for delivery at the analytical laboratory for analyses. Any and all transfer of sample custody must be documented on the Chain-of-Custody form with the name, signature, affiliation, date and time of the persons releasing and receiving custody of the samples.
- Upon completion of the sampling activities, each well shall be closed and secured by replacing the well cap and securing the lock.
- Dispose of gloves, bailers, bottom-emptying devices, and bailing line after each use.

Appendix E
Field Notes

WINZLER & KELLY
CONSULTING ENGINEERS
633 Third Street, Eureka, CA 95501-0417
(707) 443-8326 / FAX (707) 444-8330

By GSL Date 3/4/05 Client Dutra Sheet No. 1 of 1

Subject 1/4/4 monitoring Job No. 9012.9501.049

loaded sampling gear in vehicle and spoke with Carlos and Ken about site and sampling protocol.

Arrived at site to locate wells
opened wells and allowed each to equilibrate
took water levels and total well depths
decon probe prior to use and between wells.

Wells nearest river were without any detectable water #MW-1, MW-4

MW-5 was determined to be sampled and not purged if there was any water. which was done.

Wells MW-2 + 3 were purged and then sampled recharge rate were good.

Storage drum for purge water at well head MW-2 is 80-90% full and nearly rusted through

Purge water for MW-3 was placed in nearly empty drum labled MW-1, MW-2 & MW-3 purge water.

well cap for MW-5 needs to be replaced.

Secured wells & drums

Dropped off samples at NCL.

CONSULTING ENGINEERS

WATER LEVEL MEASUREMENT DATA SHEET

PROJECT NAME: Delta

PROJECT NUMBER: 90129801-049

TODAY'S DATE: 3/4/05

FIELD PERSONNEL: Lester

WELL NUMBER	OPEN WELL	INITIAL WATER LEVEL		FINAL WATER LEVEL		COMMENTS
	Time	Time	Depth to Water (ft. bgs)	Time	Depth to Water (ft. bgs)	
MW-4	0825	0905	dry	—	—	
MW-5	0827	0908	10.10			gw elev. 38.52
MW-3	0831	0912	11.75	1055	12.13	gw elev. 36.05
MW-2	0855	0915	7.66	1030	9.42	gw elev. 39.83
MW-1	0840	0920	dry	—	—	

Weather Conditions Today: lite sprinkles / clearing

WINZLER & KELLY
CONSULTING ENGINEERS

DISSOLVED OXYGEN MEASUREMENT FORM

PROJECT NAME: Dutra
PROJECT NUMBER: 90129801.049

TODAY'S DATE: 3/4/05
FIELD PERSONNEL: Lester

Well No.	High Range (D.O. > 3 mg/L)		Low Range (D.O. < 3 mg/L)		Comments
	No. of Drops	D.O. Conc. (mg/L) =(No. of Drops) x (1 mg/L)	No. of Drops	D.O. Conc. (mg/L) =(No. of Drops) x (0.2 mg/L)	
MW-5	4	4.0			
MW-2	3	3.0			
MW-3			2	0.4	

Weather Conditions Today: light rain / overcast, light winds

WINZLER & KELLY
CONSULTING ENGINEERS

WELL SAMPLING DATA SHEET

PROJECT NAME: Dutra
PROJECT NUMBER: 90129801049
WELL DESIGNATION: MW-2

PROJECT DATE: 3/4/05
SAMPLER: G Lester
SAMPLE NUMBER: MW-2

CONDITION OF WELL HEAD/VAULT/CAP & LOCK:
A. TOP OF CASING ELEVATION:
B. DEPTH TO GROUNDWATER (initial): 7.66
C. DEPTH OF WELL: MEASURED 19.60
D. HEIGHT OF WATER COLUMN (C-B):
E. GROUNDWATER ELEVATION (A-B):

CASING DIAMETER: 2" ✓ 3"_____ 4"_____ OTHER_____

CALCULATED WELL VOLUME: D X V = 0.163 · 11.94 = 2 · 3 = .65
Volume (V) of 2" well - 0.163 gal/ft
Volume (V) of 4" well - 0.653 gal/ft

ODOR_____ SHEEN_____ FLOATING PRODUCT THICKNESS_____

PUMP TYPE: POLY BAILER_____ STAINLESS BAILER_____
ELECTRIC_____ OTHER_____

PUMP DEPTH:

TIME	GALLONS PURGED	NO. OF WELL VOLUMES	pH	TEMPERATURE (°F OR °C)	CONDUCTIVITY (mmhos/cm or µmhos/cm	TURBIDITY (NTU or visual)
1000	initial		6.98	12.9	4.5	clear
1010	2	1	7.06	13.6	4.1	cloudy
1022	4	2	7.01	14.0	.44	cloudy
1027	6	3	7.10	14.0	.42	cloudy

RECHARGE RATE (qualitative): 84% at sampling

SAMPLER TYPE: TEFLON BAILER_____ ACRYLIC BAILER_____ DISPOSABLE BAILER ✓

SAMPLES COLLECTED:
PRESERVED VOA'S_____ UNPRESERVED VOA'S_____
PRESERVED LITERS_____ UNPRESERVED LITERS_____
500 ml PLASTIC BOTTLE WITH PRESERVATIVE FOR METALS:
FILTERED_____ UNFILTERED_____
OTHER_____

COMMENTS:

WINZLER & KELLY
CONSULTING ENGINEERS

WELL SAMPLING DATA SHEET

PROJECT NAME: Dutra
PROJECT NUMBER: 90129801.049
WELL DESIGNATION: MW-3

PROJECT DATE: 3/4/05
SAMPLER: G. Lester
SAMPLE NUMBER: MW-3

CONDITION OF WELL HEAD/VAULT/CAP & LOCK:
A. TOP OF CASING ELEVATION:
B. DEPTH TO GROUNDWATER (initial): 11.75
C. DEPTH OF WELL: MEASURED 14.55
D. HEIGHT OF WATER COLUMN (C-B): 2.8
E. GROUNDWATER ELEVATION (A-B):

CASING DIAMETER: 2" ✓ 3" _____ 4" _____ OTHER _____

CALCULATED WELL VOLUME: D X V = .163 · 2.8 = .46 = 1.5 g
Volume (V) of 2" well - 0.163 gal/ft
Volume (V) of 4" well - 0.653 gal/ft

ODOR _____ SHEEN _____ FLOATING PRODUCT THICKNESS _____

PUMP TYPE: POLY BAILER _____ STAINLESS BAILER _____
ELECTRIC _____ OTHER _____

PUMP DEPTH:

TIME	GALLONS PURGED	NO. OF WELL VOLUMES	pH	TEMPERATURE (°F OR °C)	CONDUCTIVITY (mmhos/cm or µmhos/cm	TURBIDITY (NTU or visual)
1034	initial		6.54	14.7	0.63	clear
1040	.5	1	6.55	14.8	0.59	cloudy
1042	1.0	2	6.62	15.0	0.56	"
1045	1.5	3	6.69	15.1	0.56	"

RECHARGE RATE (qualitative):

SAMPLER TYPE: TEFLON BAILER _____ ACRYLIC BAILER _____ DISPOSABLE BAILER ✓

SAMPLES COLLECTED:
PRESERVED VOA'S 3 UNPRESERVED VOA'S 2
PRESERVED LITERS _____ UNPRESERVED LITERS _____
500 ml PLASTIC BOTTLE WITH PRESERVATIVE FOR METALS:
FILTERED _____ UNFILTERED _____
OTHER _____

COMMENTS:

Appendix F

Winzler & Kelly Historical Reports, Well Logs